

CLAIMS

That which is claimed is:

1. A bladder comprising:
a sealed outer barrier;
a foam tensile member located within the barrier and bonded to opposite sides of the barrier; and
a fluid located within the barrier, the fluid being pressurized to place an outward force upon the barrier and induce tension in the tensile member.
2. The bladder recited in claim 1, wherein the tensile member is directly bonded to the opposite sides of the barrier.
3. The bladder recited in claim 1, wherein the barrier defines an interior volume having a first portion and a second portion, the fluid being located within the first portion, and the tensile member being located within the second portion.
4. The bladder recited in claim 1, wherein the tensile member has a first section and a second section, a density of the tensile member in the first section being greater than a density of the tensile member in the second section.
5. The bladder recited in claim 1, wherein the tensile member is continuous and extends between opposite sides of the barrier.
6. The bladder recited in claim 1, wherein the tensile member extends between opposite sides of the barrier and defines a plurality of channels extending into the foam.
7. The bladder recited in claim 6, wherein the channels extend through the tensile member.

8. The bladder recited in claim 6, wherein the channels exhibit constant dimensions through the tensile member.
9. The bladder recited in claim 6, wherein a first channel is oriented laterally and a second channel is oriented longitudinally.
10. The bladder recited in claim 9, wherein the first channel and the second channel intersect.
11. The bladder recited in claim 6, wherein the channels form columns of the foam.
12. The bladder recited in claim 11, wherein the columns are substantially vertical in a first portion of the tensile member, and the columns are non-vertical in a second portion of the tensile member.
13. The bladder recited in claim 6, wherein at least a portion of the channels exhibit a radial orientation.
14. The bladder recited in claim 1, wherein a first surface of the barrier is contoured to form a depression.
15. The bladder recited in claim 14, wherein a second surface of the barrier is substantially planar.
16. The bladder recited in claim 1, wherein the barrier and the tensile member are formed of a thermoplastic polymer material.

17. The bladder recited in claim 1, wherein the barrier and the tensile member are formed of a thermoplastic polyurethane material.
18. An article of footwear having an upper and a sole structure secured to the upper, the sole structure comprising:
 - a sealed outer barrier formed of a polymer material;
 - a foam tensile member formed of the polymer material, the tensile member being directly bonded to opposite sides of the barrier; and
 - a fluid located within the barrier and pressurized to place an outward force upon the barrier and induce tension in the tensile member.
19. The article of footwear recited in claim 18, wherein the polymer material is thermoplastic polyurethane.
20. The article of footwear recited in claim 18, wherein the barrier, tensile member, and fluid form a bladder that is at least partially encapsulated by a polymer foam material.
21. The article of footwear recited in claim 20, wherein the bladder is positioned in a heel region of the footwear.
22. The article of footwear recited in claim 18, wherein the tensile member has a first section and a second section, a density of the tensile member in the first section being greater than a density of the tensile member in the second section.
23. The article of footwear recited in claim 18, wherein the tensile member is continuous and extends between opposite sides of the barrier.

24. The article of footwear recited in claim 18, wherein the tensile member extends between opposite sides of the barrier and defines a plurality of channels extending into the thermoplastic polymer foam material.
25. The article of footwear recited in claim 24, wherein the channels extend through the tensile member.
26. The article of footwear recited in claim 24, wherein at least a portion of the channels exhibit a radial orientation.
27. The article of footwear recited in claim 24, wherein the channels form columns of the foam.
28. The article of footwear recited in claim 27, wherein the columns are substantially vertical in a first portion of the tensile member, and the columns are non-vertical in a second portion of the tensile member.
29. The article of footwear recited in claim 18, wherein the barrier is unbonded to the tensile member in sidewall portions.
30. An article of footwear comprising:
an upper that defines an interior void for receiving a foot; and
a sole structure secured to the upper, the sole structure including a bladder that forms at least a portion of a midsole, the bladder including:
a sealed outer barrier formed of a thermoplastic polymer sheet material, the barrier defining an interior volume;

a tensile member formed of a thermoplastic polymer foam material, the tensile member being located within the interior volume and bonded to opposite sides of the barrier; and

a fluid located within the interior volume, at least a portion of the fluid being separate from the tensile member, and the fluid being pressurized to place an outward force upon the barrier and induce tension in the tensile member.

31. The article of footwear recited in claim 30, wherein the tensile member is directly bonded to the opposite sides of the barrier.

32. The article of footwear recited in claim 30, wherein the barrier is unbonded to the tensile member in sidewall portions of the bladder.

33. The article of footwear recited in claim 30, wherein the thermoplastic polymer sheet material and the thermoplastic polymer foam material are a polyurethane material.

34. The article of footwear recited in claim 30, wherein the barrier is substantially impermeable to the fluid.

35. The article of footwear recited in claim 30, wherein the tensile member has a first section and a second section, a density of the tensile member in the first section being greater than a density of the tensile member in the second section.

36. The article of footwear recited in claim 35, wherein the first section of the tensile member is positioned on a medial side of the footwear.

37. The article of footwear recited in claim 30, wherein the bladder is positioned in a heel region of the footwear, and an upper surface of the bladder forms a depression for receiving a heel portion of the foot.

38. The article of footwear recited in claim 37, wherein a lower surface of the barrier is substantially planar.

39. The article of footwear recited in claim 30, wherein the tensile member is continuous and extends between opposite sides of the barrier.

40. The article of footwear recited in claim 30, wherein the tensile member extends between opposite sides of the barrier and defines a plurality of channels extending into the thermoplastic polymer foam material.

41. The article of footwear recited in claim 40, wherein the channels extend through the tensile member.

42. The article of footwear recited in claim 40, wherein a first channel is oriented in a lateral direction and a second channel is oriented in a longitudinal direction.

43. The article of footwear recited in claim 42, wherein the first channel and the second channel intersect.

44. The article of footwear recited in claim 40, wherein at least a portion of the channels exhibit a radial orientation.

45. The article of footwear recited in claim 40, wherein the channels form columns of the foam.
46. The article of footwear recited in claim 45, wherein the columns are substantially vertical in a first portion of the tensile member, and the columns are non-vertical in a second portion of the tensile member.
47. An article of footwear comprising:
an upper that defines an interior void for receiving a foot; and
a sole structure secured to the upper, the sole structure including a bladder that forms at least a portion of a midsole, the bladder including:
a sealed outer barrier formed of a first sheet and a second sheet of polymer material that are bonded together to define an interior volume;
a tensile member formed of a polymer foam material and located within the interior volume, the tensile member including a first portion spaced from a second portion and connected by a plurality of columns, the first portion being bonded to the first sheet and the second portion being bonded to the second sheet; and
a pressurized fluid located within the interior volume.
48. The article of footwear recited in claim 47, wherein the polymer material and the polymer foam material are thermoplastic polymers.
49. The article of footwear recited in claim 47, wherein the first portion and the second portion are directly bonded to the barrier.

50. The article of footwear recited in claim 47, wherein the barrier is unbonded to the tensile member in sidewall portions of the bladder.
51. The article of footwear recited in claim 47, wherein the columns form a plurality of channels extending into the thermoplastic polymer foam material.
52. The article of footwear recited in claim 51, wherein the channels extend through the tensile member.
53. The article of footwear recited in claim 51, wherein a first channel is oriented in a lateral direction and a second channel is oriented in a longitudinal direction.
54. The article of footwear recited in claim 51, wherein at least a portion of the channels exhibit a radial orientation.
55. The article of footwear recited in claim 47, wherein the columns are substantially vertical in a first portion of the tensile member, and the columns are non-vertical in a second portion of the tensile member.
56. The article of footwear recited in claim 47, wherein the fluid places an outward force upon the barrier and induce tension in the columns.
57. A method of manufacturing a component for an article of footwear, the method comprising steps of:
- forming a barrier that defines an interior volume;
 - positioning a foam member within the interior volume;
 - directly bonding the foam member to opposite sides of the barrier; and

pressurizing the interior volume to place an outward force upon the barrier and induce tension in the foam member.

58. The method recited in claim 57, wherein the step of forming includes manufacturing the barrier from at least one sheet of a thermoplastic polymer material.

59. The method recited in claim 57, wherein the step of directly bonding includes heating the foam member and the barrier to bond the foam member and the barrier without an adhesive.

60. The method recited in claim 57, wherein the step of directly bonding includes forming an unbonded area in sidewall portions of the component.

61. The method recited in claim 57, wherein the step of pressurizing includes sealing the barrier.

62. The method recited in claim 57, further including a step of selecting a material for the barrier and the foam member to be a thermoplastic polymer.

63. The method recited in claim 62, wherein the thermoplastic polymer is polyurethane.